

Name(s) of Risk Team Members: D. Passarello and M. Bannon			Point Value → Parameter ↓		1		2		3		4		5				
Area/Facility Description Title: Collider-Accelerator Siemens and Westinghouse M.G. Sets (buildings 911, 928)			Occupancy or Use		≤once/year		≤once/month		≤once/week		≤once/shift		≥once/shift				
Area/Facility # (if applicable): Area-Wide FRA 8-05																	
Area/Facility Description: Area-Wide for Siemens and Westinghouse M.G. Sets (buildings 911, 928)			Severity		First Aid Only		Medical Treatment		Lost Time		Partial Disability		Death or Permanent Disability				
			Likelihood		Extremely Unlikely		Unlikely		Possible		Probable		Multiple				
Approved by: <i>E. Lessard</i> Date: 05/18/05 Rev.#: 0																	
Reason for Revision (if applicable):									Comments:								
					Before Additional Controls							After Additional Controls					
Physical Item or Activity	Hazard(s)	Control(s)			Occupancy A	Severity B	Likelihood C	Risk* AxBxC	Control(s) Added to Reduce Risk				Occupancy A	Severity B	Likelihood C	Risk* AxBxC	% Risk Reduction
Electrical Equipment & Power Supplies BNL Class A & B <250 VAC; <1000Vdc	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; disconnected cable policy; installations comply with applicable codes; procedures; training; distribution drawings; LOTO; Kirk keys; Energized Electrical Work permits; qualified electricians and technicians; cabinet interlocks; postings; locked areas; guarding; work planning; GFCI; grounding standards; emergency procedures; PPE; compliance with NFPA 70 E requirements			5	4	2	40	See Notes 1 through 4.				5	3	2	30	25%
Electrical Equipment & Power Supplies BNL Class C <600 VAC; <6000 VDC	Arc Flash	Procedures; training; PPE; compliance with NFPA 70 E requirements			3	5	2	30	See Notes 1 through 4.				3	4	2	24	20%
Electrical Disconnects And Switches	Arc Flash	Procedures; training; PPE; Compliance with NFPA 70 E requirements			2	4	3	24	See Notes 1 through 4.				2	4	2	16	33%
Electrical Disconnects And Switches	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; disconnected cable policy; installations comply with applicable codes; procedures; training; distribution drawings; LOTO; Kirk keys; Energized Electrical Work permits; qualified electricians and technicians; cabinet interlocks; postings; locked areas; guarding; work planning; GFCI; grounding standards; emergency procedures; PPE; compliance with NFPA 70 E requirements			2	5	2	20	See Notes 1 through 4.				2	4	2	16	20%
Motor Control Centers; Panels And Wall Sockets	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; disconnected cable policy; installations comply with applicable codes; procedures; training; distribution drawings; LOTO; Kirk keys; Energized Electrical Work permits; committee reviews; qualified electricians and technicians; cabinet interlocks; postings; locked areas; guarding; work planning; grounding standards; emergency procedures; PPE; compliance with NFPA 70 E requirements			4	5	2	40	See Notes 1 through 4.				4	4	2	32	20%

Motor Control Centers; Panels And Wall Sockets	Arc Flash	Procedures; training; PPE; Compliance with NFPA 70 E requirements	4	4	2	32	See Notes 1 through 4.	4	3	2	24	25%
Extension Chords; Temporary Wiring And Power Strips	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; disconnected cable policy; installations comply with applicable codes; procedures; training; distribution drawings; qualified electricians and technicians; GFCI; grounding standards; emergency procedures; PPE; compliance with NFPA 70 E requirements	4	3	3	36	See Notes 1 through 4.	4	3	2	24	33%
Lighting	Poor visibility	Tier 1 inspections; maintenance; emergency lighting; temporary lighting	3	2	3	18						
Lighting	Falls on same level	Tier 1 inspections; maintenance; emergency lighting; temporary lighting	3	3	3	27						
Lighting	Being struck against an object, such as a carpenter walking into a door frame, or cuts and bruises from working in tight spaces	Tier 1 inspections; maintenance; emergency lighting; temporary lighting	2	3	3	18						
Material Handling	Bodily reaction – injuries resulting from bending, climbing, loss of balance and slipping without falling	Use of dollies to eliminate manual material handling tasks, ergonomic reviews of work, effective supervision at the job site, training	3	3	3	27						
Manual Material Handling	Overexertion – injuries caused by excessive lifting, pushing, pulling, holding, carrying or throwing of an object	Gloves; hardhat; handcarts; dollies; training; safety shoes	4	3	3	36						
Chemical Handling	Eye exposure	Procedures; compliance with regulations; training; CMS inventory; MSDS; volume controls; PPE as required; locked or controlled areas; postings; labeling; proper containers; segregation; proper spill cleanup equipment available; Tier 1 inspections	3	4	2	24						
Chemical Handling	Inhalation exposure	Procedures; compliance with regulations; training; CMS inventory; MSDS; volume controls; PPE as required; locked or controlled areas; postings; labeling; proper containers; segregation; proper spill cleanup equipment available; Tier 1 inspections	3	3	2	18						
Chemicals	Fire; explosions	Procedures; compliance with regulations; training; CMS inventory; MSDS; volume controls; PPE as required; locked or controlled areas; postings; labeling; proper containers; segregation; proper spill cleanup equipment available; Tier 1 inspections	3	2	2	12						
Chemical Handling	Burns	Procedures, compliance with regulations, training, CMS inventory, MSDS, volume controls, Fire/Rescue group response, PPE as required, locked or controlled areas, postings, labeling, proper containers, segregation, spill cleanup equipment available, Tier 1 inspections	3	3	2	18						
Remotely Operated Equipment	Becoming caught in or compressed by equipment	Postings; barriers; guards; maintenance; training; work planning; procedures; Tier 1 inspections	2	4	3	24						
Use of Electrical Powered Hand Tools	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; procedures; training; labeling; work planning; GFCI; grounding standards; double insulation	4	3	3	36						
Use of Electrical Powered Hand Tools	Being struck by an object, such as flying chips, rotating parts	PPE; training; maintenance; Tier 1 inspections; UL listed equipment; pre-inspections; equipment specific training; guarding; PPE; postings	4	2	3	24						

Use Of Hand Tools	Being struck against an object or cuts and bruises from working in tight spaces or near sharp surfaces	PPE; training; guarding	4	2	3	24					
Use of hand tools	Overexertion – injuries caused by excessive lifting, pushing, pulling, holding, carrying or throwing of an object	PPE, Training, work planning, procedures, proper equipment	4	3	3	36					
Noise	Hearing loss	Training; hearing protection; noise surveys; procedures; postings; medicals; engineered noise reduction; work planning; locked areas with limited access to authorized personnel only	4	3	4	48					
Confined Spaces	Entrapment, engulfment, exposure to dangerous atmospheres.	Barriers, postings, training, Confined Spaces Permits, work planning, procedures, Tier 1 inspections	2	5	2	20					
Walking – Working Surfaces	Falls on same level	PPE; Tier 1 inspections; work planning; P.E. scheduled maintenance; internal and external audits; posting; labeling; training; barriers; communication; lessons learned; safety checklist Walking and Working Surfaces	5	4	2	40					
Pressurized Systems	Being struck by an object, such as flying debris due to pressure release	Postings, PPE, maintenance, training, work planning, Cryogenic Safety Committee /ASSRC reviews, procedures, interlock systems, Certification/testing of pressure related equipment, Tier 1 inspections, LOTO, C-AD Chief ME reviews, codes and standards usage	4	3	3	36					
Hydraulics	Being struck by an object, such as flying debris due to pressure release	Design reviews, ESRC/ASSRC reviews, pressure testing, LOTO, work planning, PPE, training, procedures, posting labeling	3	4	3	36					
Hydraulics	Falls on same level	Design reviews, ESRC/ASSRC reviews, pressure testing, LOTO, work planning, Tier 1 inspections	3	4	3	36					
Hydraulics	Fire	Design reviews, ESRC/ASSRC reviews, proof testing, LOTO, work planning, PPE, training, Fire/Rescue Group response	3	4	2	24					
Moving Items with Cranes	Being struck by an object, such as a tool falling on a worker from above	Training, daily crane inspections prior to use, PE crane maintenance, PPE, certified rigging equipment, Tier 1 inspections, yearly rigging inspections, load weights and center of gravity known prior to lift, procedures, qualified riggers if required, critical lift and engineered lift requirements and reviews, warning alarms, postings, work planning, load testing, barriers	3	5	2	30					
Electrical Caged Area/ Rooms	Electrical shock	Locked areas, procedures, electrical safety training, control zones (e.g. signs and barriers), work permits, job safety analysis, LOTO, safety watch, energized electrical work permits, equipment design review, scheduled maintenance of equipment, fire rescue response, EMTs, work planning, PPE	2	5	2	20					
Batteries/UPS	Electrical shock, molten spray	PPE; procedures; training	4	2	2	16					
Batteries/UPS	Electrical shock, hydrogen gas explosion	PPE; procedures; training, ventilation	4	3	2	24					
Motor Generators, Liquid rheostat chain drive	Becoming caught in or compressed by equipment	Equipment specific training, machine guards, PPE, postings, maintenance, Tier 1 inspections, barriers, procedures, checklists	4	4	3	48					

Working with compressed air	Being struck by an object, such as flying debris due to pressure release	PPE, pressure reducing nozzles	3	3	2	18					
Work At Heights	Falls to lower level, such as falling from a ladder or over a railing	Postings; barriers; fall protection; maintenance; training; work planning; procedures; Tier 1 inspections; PPE; approved scaffolding and platforms; approved ladders; anti-slip surfaces	2	5	2	20					
<p>Further Description of Controls Added to Reduce Risk:</p> <p>NOTE 1: OSHA Teams visited C-AD during the period October 20 through October 31, 2003 and recorded electrical non-compliances. All OSHA findings will be closed by 2006 by full compliance or with an equivalent level of safety.. The status of the OSHA items are maintained in BNL’s Compliance suite, and closed on a schedule commensurate with funding.</p> <p>NOTE 2: A compliance plan to have all electrical installations accepted by an Authority Having Jurisdiction (AHJ), as per 29CFR1910 Subpart S, has been implemented by BNL. UL, CSA, LLC or other NRTL accepted equipment will be acquired at BNL for all future installations. Prior installations shall be reviewed and accepted by qualified AHJs. The plan must be completed by 2009.</p> <p>NOTE 3: Full compliance with NFPA 70E was adopted by the C-AD in December 2005. NFPA 70E prescribes protective clothing to protect against shock and arc blast; thus reducing the severity and likelihood of an injury. It also prescribes training, which is currently fulfilled by taking the 2005 version of Electrical Safety 1 and by attending the C-AD 3-hour classroom course on electrical safety rules and PPE.</p> <p>NOTE 4: Contractor and vendor training in work planning and electrical safety has been improved. Plans to reach all contractors and vendors with regard to NFPA 70E requirements prior to performing work at BNL have been implemented. C-AD has obtained lists of all its vendors and suppliers and is ensuring that they take Electrical Safety 1 or have equivalent training if needed.</p>											
*Risk:	0 to 20	21 to 40	41-60		61 to 80		81 or greater				
	Negligible	Acceptable	Moderate		Substantial		Intolerable				